Amendments to the Specification

Replace the paragraph beginning at page 6, line 33 with the following amended paragraph:

Turning now to FIG. 6, curve 600 represents the Curie temperature of the samples of $CoFe_{2-X}Mn_XO_4$ of FIGS. 1, 3-4 and curve 602 represents the maximum magnetostriction of the samples. It can be seen that the Curie temperature decreases approximately linearly with increasing manganese content. When the Mn content increases, the magnitude of the maximum magnetostriction also decreases as a function of Mn content. It can be seen that the manganese substituted cobalt ferrite has an amplitude of magnetostriction of at least about 50 to about 250 ppm.

Replace the paragraph beginning at page 7, line 1 with the following amended paragraph:

Returning to FIG. 2, note that metal binder can also be added to the Mn substituted cobalt ferrite. In one embodiment, the metal binder consists of 3% Ni, 97% Ag by volume. The binder is created by mixing high purity Ni and Ag powder together where the Ag powder comprises a larger volume fraction of the metallic binder and the Ni powder comprise a least volume fraction of the metallic binder. The metal bonded samples consisted of 2% binder and 98% Mn substituted cobalt ferrite by volume. The metal binder is added to the Mn substituted cobalt ferrite powder before the final ball-milling and finish grinding to ensure it is well mixed.

Replace the paragraph beginning at page 7, line 18 with the following amended paragraph:

Turning now to FIGS. 7-8, one application for manganese-substituted cobalt ferrites is use as a torque sensor 700. The sensor 700 has a band 702 of manganese-substituted cobalt ferrite material. As torque is applied to the shaft 704 as represented by arrows 706, 708, the magnetic response of the band 702 changes. A typical result of the magnetic response is illustrated in FIG. 8. The magnetomechanical response to applied torque has been measured to be as high as 64 A/Nm^2 with a small hysteresis of $\pm$ 0.5 Nm.

Replace the paragraph beginning at page 8, line 11 with the following amended paragraph:

From the foregoing, it can be seen that manganese-substituted cobalt ferrites offer improved scope for developing magnetomechanical sensors and actuators beyond that possible with the original cobalt ferrite material. Substitution of Mn for Fe has the effect of making a substantial decrease in Curie temperature, which should have a substantial effect on the temperature dependence of magnetic and magnetomechanical properties contributing to magnetomechanical hysteresis. The maximum magnetostriction magnitude, although decreased, is still sizeable, and is more than sufficient for use as a magnetomechanical stress sensing material for many applications. The saturation magnetization, upon which the magnitude of the external field used in non-contact sensing will depend, shows only a modest decrease throughout the compositional range. Similarly, the slope of the magnetostriction curve at low field, upon which the sensitivity for stress sensing applications will depend, is higher for manganese-substituted cobalt ferrites $CoFe_{2-X}Mn_XO_4$ with manganese content up to x = 0.3. As a result, it should be possible to adjust the temperature dependence of magnetomechanical hysteresis while still maintaining sufficient magnetomechanical sensor material performance. The substituted cobalt ferrite material may be created without using any binder, with either the metal or organic binders, or with both of the metal and organic binders. The approach to use depends on the desired material properties. ~~Transition m~~Metal–substituted cobalt ferrite using Mn, Cr, Zn, Al, or Cu or other transition metals or mixtures thereof, could also give the desired material properties.

Replace the paragraph beginning at page 8, line 30 with the following amended paragraph:

The effects of composition on the magnetic and magnetomechanical properties of cobalt ferrite substituted with manganese have been described. The Curie temperature of cobalt ferrite can be reduced over a substantial range by the substitution of Manganese for Ferrite. The fact that the Curie temperature and magnetostriction of manganese-substituted cobalt ferrite are selectable by adjusting manganese content allows the material properties to be optimized for use as stress sensors over a range of operational temperatures. ~~Transition m~~Metal–substituted cobalt ferrite using Mn, Cr, Zn, Al, or Cu or other transition metals or mixtures thereof, with or without Mn could also allow the material properties to be optimized for use as stress sensors over a range of operational temperatures.